

Applicant : Yong MA
Appl. No. : 10/077,522
Examiner : Cornelius Jackson
Docket No. : 703683.3 (formerly 270/205)

IN THE CLAIMS:

1. (Previously Amended) A wavelength tunable laser comprising
a laser diode, and
a wavelength selective external cavity, the external cavity including a resonator
formed of electro-optic material and having an adjustable refractive index induced tunable
resonance wavelength, and first and second waveguides optically coupled to the resonator along
first and second coupling regions wherein light traveling through the waveguides having a
wavelength matching a tuned resonance wavelength of the resonator is coupled into the resonator
through evanescent wave coupling, the first and second waveguides being parallelly disposed in
a lateral direction adjacent and extending beyond the first and second coupling regions, the first
waveguide having a first end optically coupled to the laser diode, and the second waveguide
having one end optically coupled to a reflector.

2. (Previously Amended) The tunable laser of claim 1 wherein the first and second
waveguides are vertically coupled to the resonator such that evanescent wave coupling between
the resonator and first and second waveguides is generally orthogonally directed relative to a
plane generally defined by a top surface of the resonator and planes generally defined by a top
surface of each of the first and second waveguides that extend in the lateral direction and
generally parallel to the resonator plane.

3. (Original) The tunable laser of claim 2 wherein the first and second waveguides
and the resonator are formed on a single substrate comprising a plurality of layers.

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Docket No. : 703683.3 (formerly 270/205)

4. (Previously Amended) The tunable laser of claim 3 wherein the plurality of layers includes a separation layer interposing a resonator core layer and a waveguide layer.

5. (Previously Amended) The tunable laser of claim 4 wherein the first and second waveguides are formed in a single layer.

6. (Original) The tunable laser of claim 4 wherein the first and second waveguides are formed in different layers.

7. (Previously Amended) The tunable laser of claim 1 wherein the first and second waveguides are horizontally coupled to the resonator such that evanescent wave coupling between the resonator and first and second waveguides is directed in a generally orthogonally direction between the first and second waveguides.

8. (Previously Amended) The tunable laser of claim 5 wherein the resonator and the first and second waveguides are spaced apart a predetermined distance along the first and second coupling regions forming evanescent wave coupling gaps there between.

9. (Previously Amended) The tunable laser of claim 1 wherein the resonator comprises a plurality of resonators wherein adjacent resonators are spaced apart a predetermined distance to cause a constructive interference effect among the resonators the plurality of resonators.

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Docket No. : 703683.3 (formerly 270/205)

10. (Previously Amended) The tunable laser of claim 1 further comprising a coupling lens interposing an end facet of the laser diode and an end facet of the first end of the first waveguide.

11. (Previously Amended) The tunable laser of claim 1 wherein the laser diode is butt-joint coupled to an end facet of the first end of the first waveguide.

12. (Original) The tunable laser of claim 1 wherein the laser diode and external cavity are formed on a single substrate.

13. (Previously Amended) The tunable laser of claim 1 wherein the reflector comprises a mirror positioned adjacent an end facet on the one end of the second waveguide coupled to the reflector.

14. (Previously Amended) The tunable laser of claim 13 further comprising a collimated lens interposing the mirror and the one end of the second waveguide coupled to the reflector.

15. (Previously Amended) The tunable laser of claim 1 wherein the reflector comprises a reflection coating applied to an end facet on the one end of the second waveguide, wherein the reflection coating has a reflectivity of about 100% within the tunable laser device working wavelength range.

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Appl. No. : 10/077,522
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Docket No. : 703683.3 (formerly 270/205)

16. (Previously Amended) The tunable laser of claim 12 further comprising an electro-absorption modulator formed on the substrate with the laser diode and external cavity and positioned adjacent an output end facet of the laser diode.

17. (Original) The tunable laser of claim 16 further comprising an external gain section formed adjacent the electro-absorption modulator.

18. (Original) The tunable laser of claim 1 wherein at least one of the first and second waveguides includes an amplifier.

19. (Original) The tunable laser of claim 1 wherein the laser diode comprises a multi-layer semiconductor wafer structure including first and second end facets.

20. (Original) The tunable laser of claim 19 wherein one of the first and second end facets is coated with an anti-reflection coating.

21. (Original) The tunable laser of claim 1 further comprising first and second electrodes formed on opposite sides of the resonator.

22. (Original) The tunable laser of claim 1 wherein each of the first and second waveguides has two ends that are thicker than a central portion thereof.

23. -- 29. (Previously Cancelled)